

# **Epidemiology of EV71 in Taiwan, 1998-2001**

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# Introduction

# Enterovirus

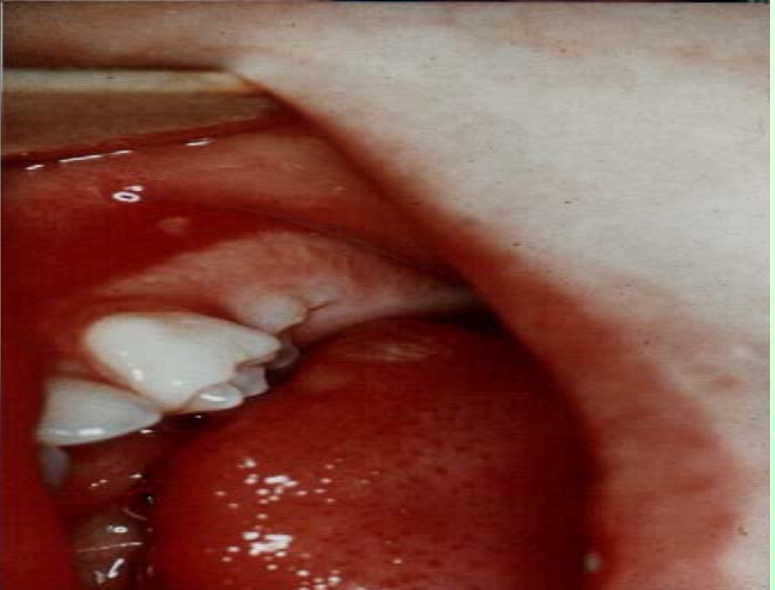
- Poliovirus
- Coxsackie A virus
- Coxsackie B virus
- Echovirus
- Recent identified enterovirus

# Specific clinical syndromes (I)

- Enteroviral enantheams including herpangina
- Paralysis
- Aseptic meningitis / encephalitis
- Neonatal enteroviral disease
- Carditis
- Acute hemorrhagic conjunctivitis

# Specific clinical syndromes (II)

- Pleurodynia
- Respiratory illness
- Gastrointestinal disease
- Diabetes
- Arthritis
- Others







圖三：手足口病出現在腳上的水泡。



圖四：手足口病出現在臀部的疹子。



圖五：手足口病出現在手上的水泡。



圖六：手足口病出現在口腔的潰瘍。





# Characteristics

- Summer viruses
- More prevalent among persons of lower SES in urban area
- Young children are important transmitters
- Can be isolated from lower and / or upper G-I tract
- Transmitted by Fecal-oral and respiratory routes
- Man is natural reservoir

# Epidemiology

- EV71 infection was first recognized in 1969.
- EV71 infection may be asymptomatic or cause fatal illness.
- Several outbreaks have been reported from Bulgaria, Hungary and Malaysia.
- Outbreak of EV71 infection occurred in Taiwan in 1998.

# Purpose

- To assess the epidemiology of enterovirus 71 infection in Taiwan.

# Methods

- 1.Sentinel reporting system
- 2.Severe cases reporting system
- 3.Laboratory reporting system

# Sentinel reporting system

- Operated since 1990
- 450 sentinel physicians were included from whole island.
- Number of suspected cases reported weekly by telephone or Fax.

# Case definition

Outpatients with HFMD or Herpangina

# Severe case reporting system

- Teaching and regional hospitals were informed to report.
- 17 teaching hospitals.  
54 regional hospitals.
- Submitted patient's records to Taiwan CDC.
- Records were reviewed by Regional Committee.

# Case definition

Inpatients with HFMD/Herpangina and one of the following :

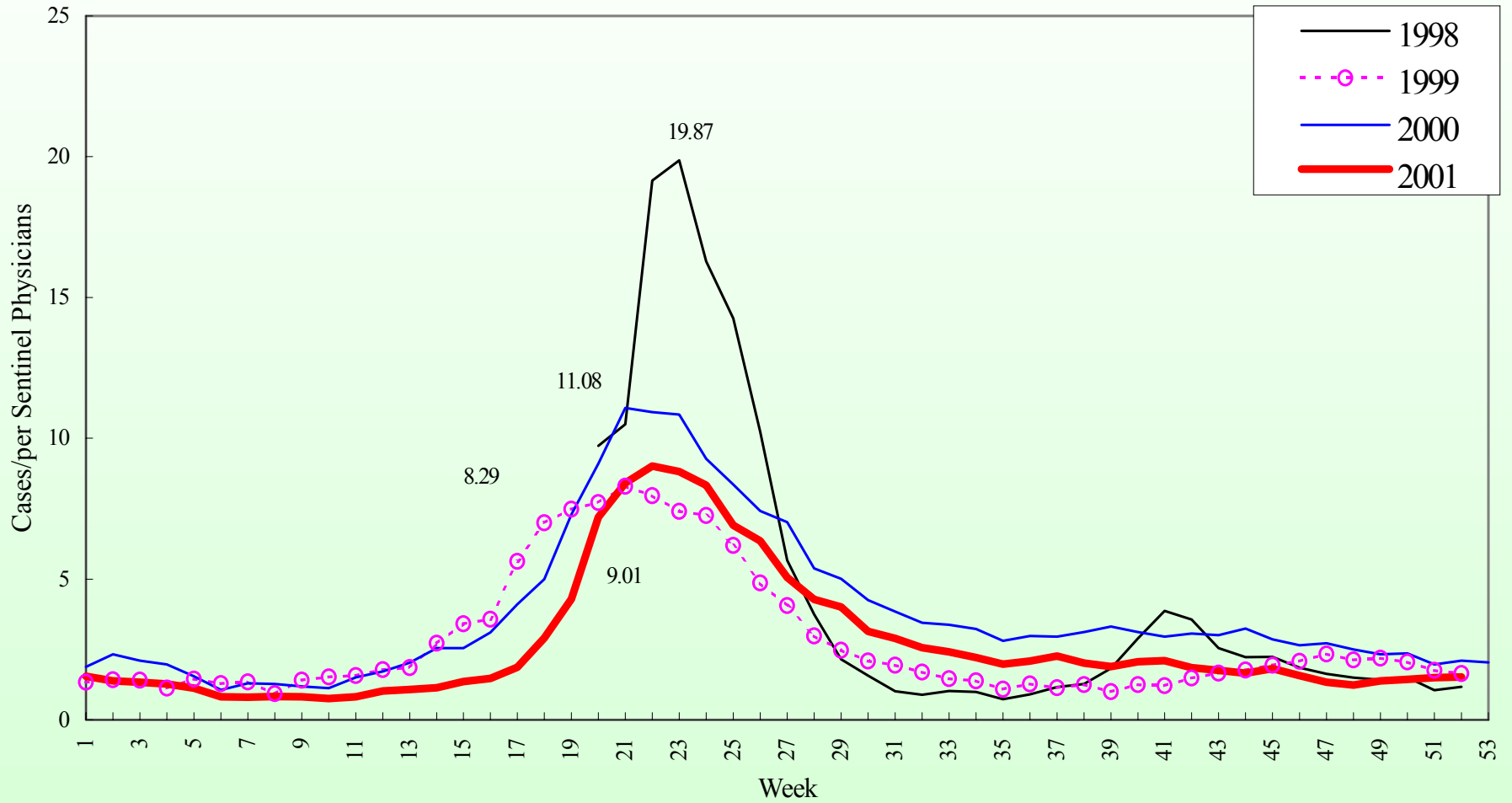
- Neurologic complications.
- Cardiopulmonary complications.
- Generalized sepsis of infants.



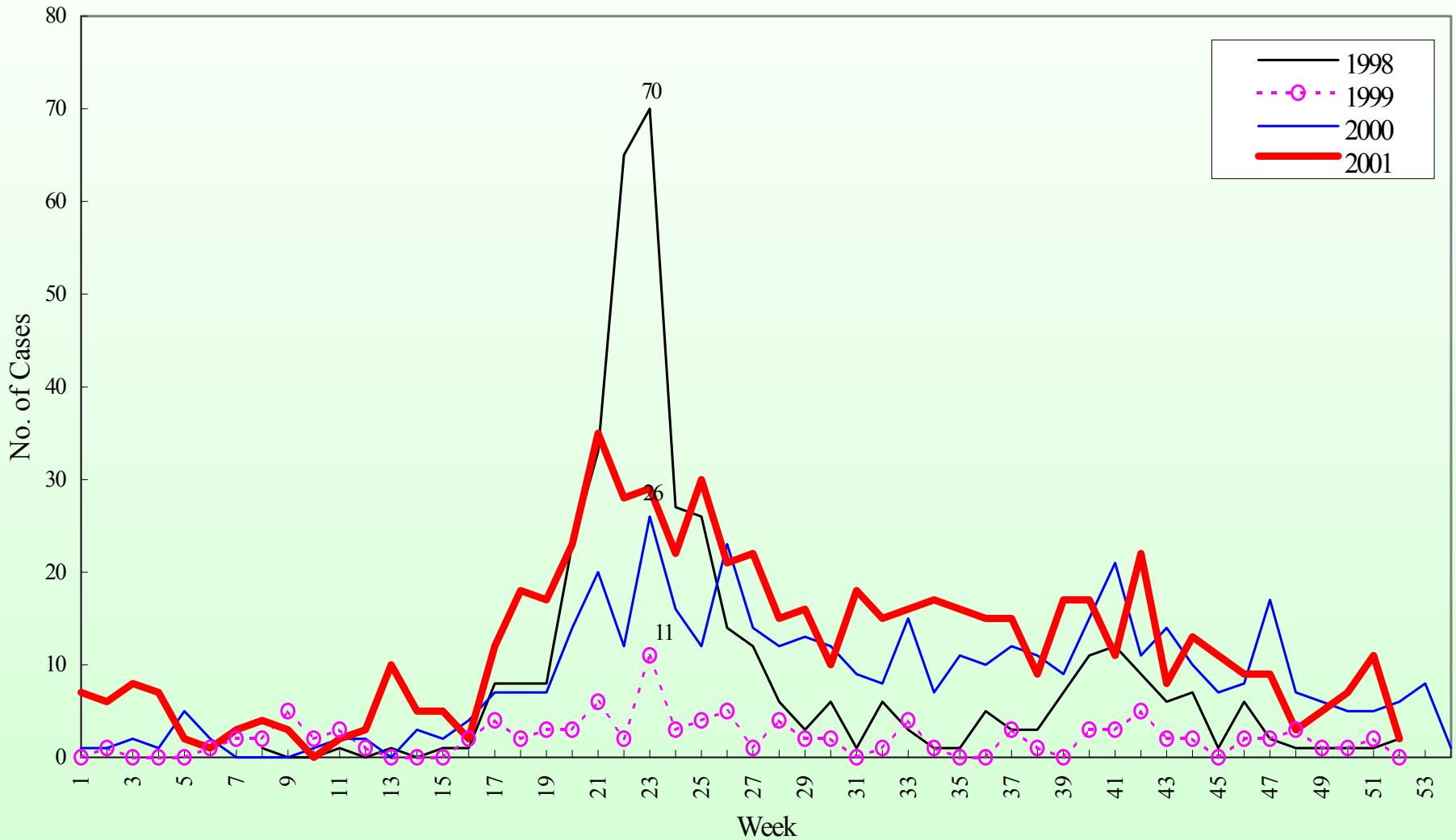
# Laboratory reporting system

- Viral laboratories located 14 hospitals and department of health.
- Specimen consisted of throat swabs, stool, CSF and blood samples.
- Inpatients and sentinel outpatients suspected of having EV infection.

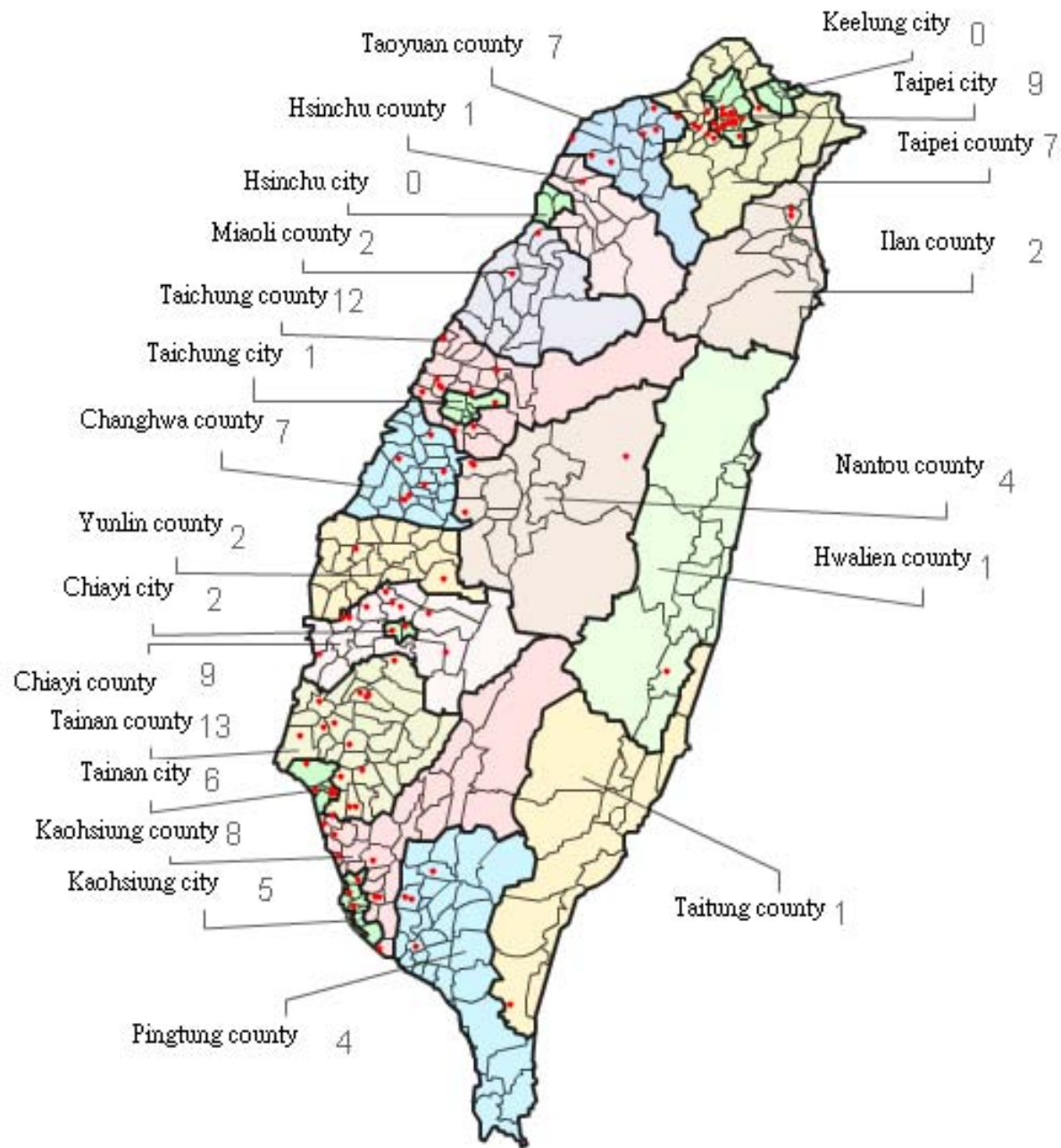
# Results



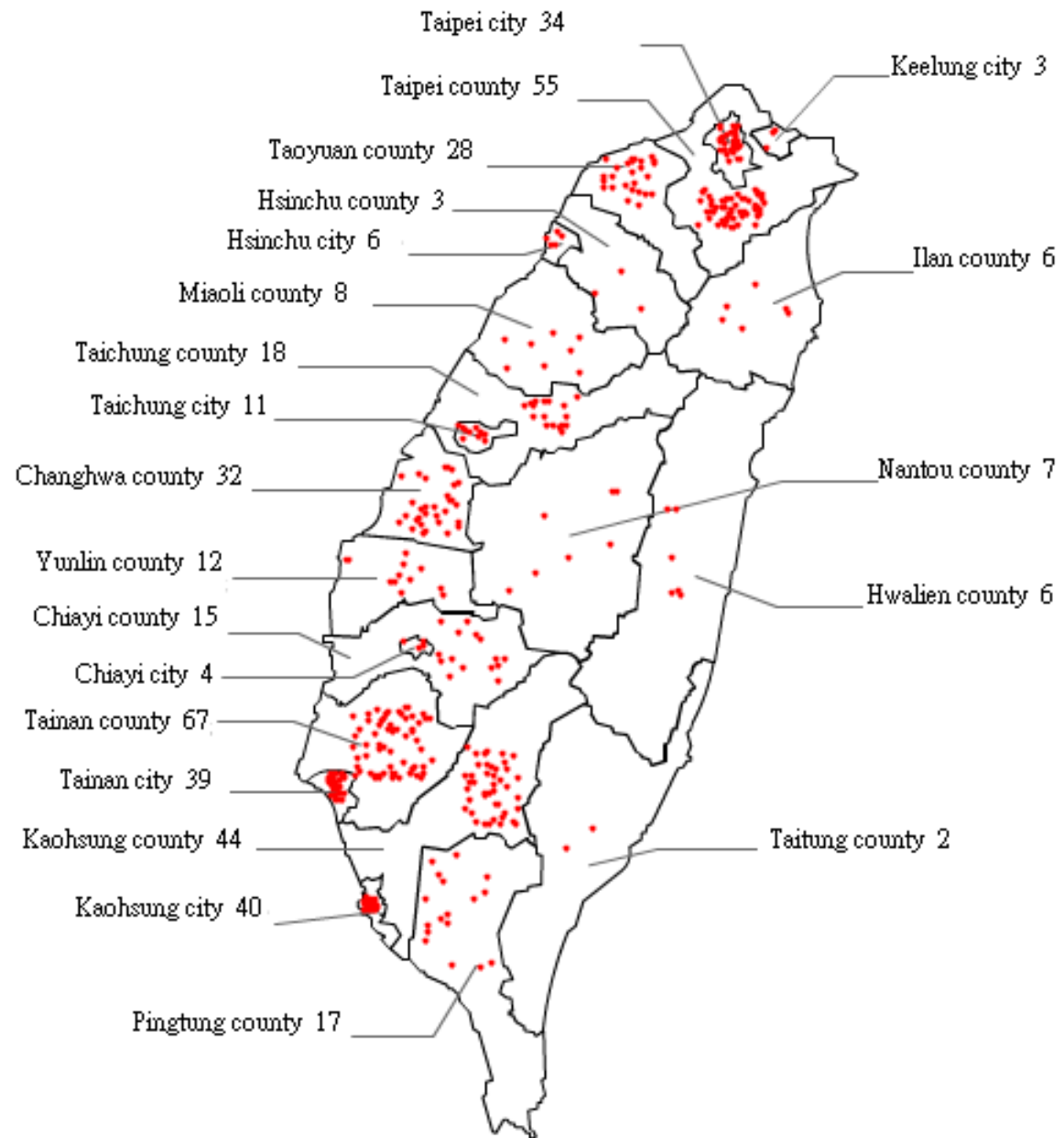
Numbers of case per sentinel physicians, by week, 1998~2001



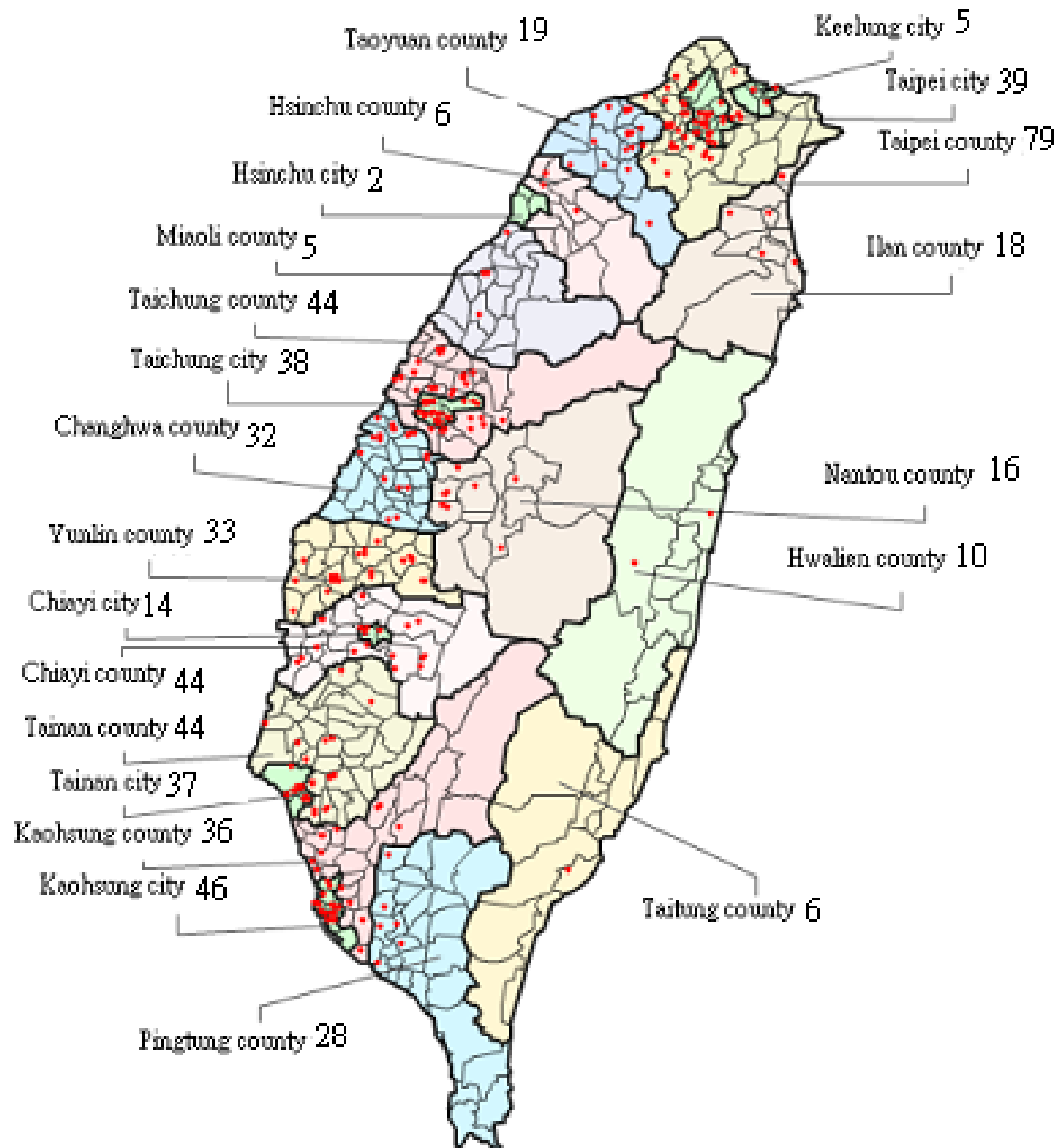
Epidemic curve of severe cases, onset by week , 1998~2001



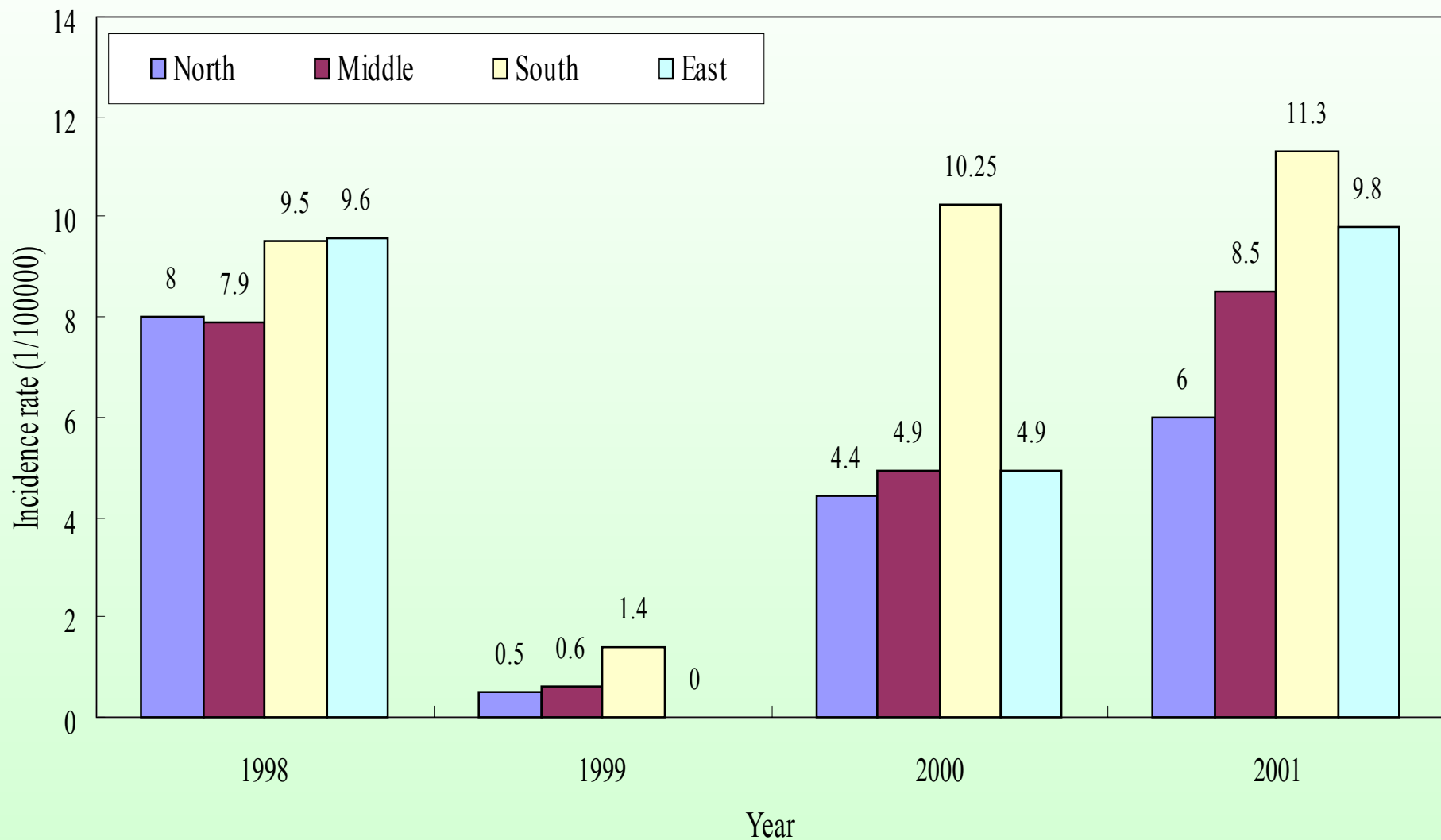
**Distribution of severe cases, by area in 1999**



**Distribution of severe cases, by area in 2000**



**Distribution of severe cases, by area in 2001**

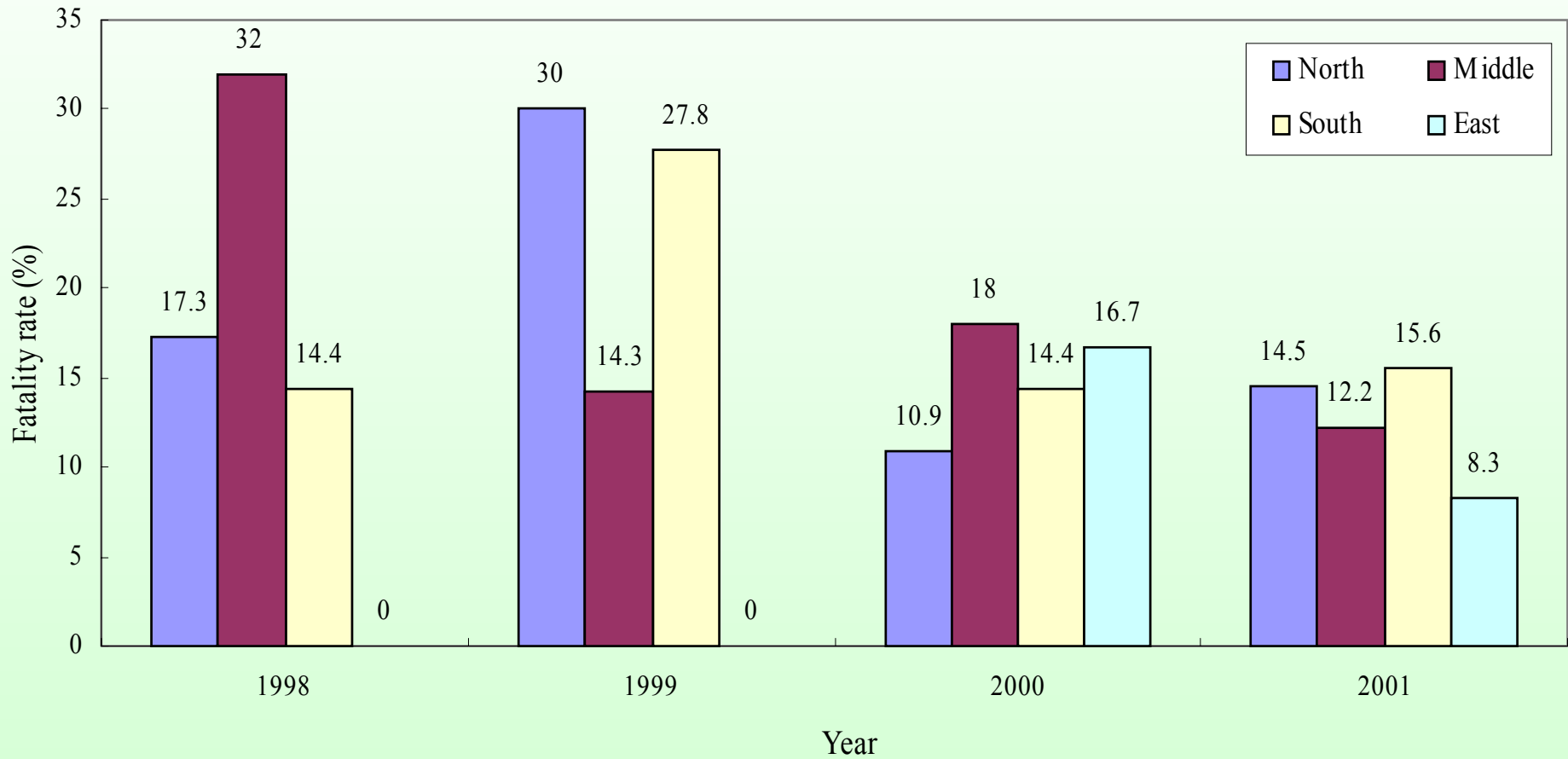


Incidence of severe case, by area, 1998~2001



## Fatality rate of severe cases, by year, 1998~2001

<b>Year</b>	<b>No. severe case</b>	<b>No. death</b>	<b>Fatality rate(%)</b>
<b>1998</b>	<b>405</b>	<b>78</b>	<b>19.3</b>
<b>1999</b>	<b>35</b>	<b>9</b>	<b>25.7</b>
<b>2000</b>	<b>291</b>	<b>41</b>	<b>14.1</b>
<b>2001</b>	<b>389</b>	<b>55</b>	<b>14.1</b>



Fatality rate of severe EV infection, by area, 1998~2001

## Fatality of severe cases, by gender, 1998~1999

	1998		1999	
	No. of case	Fatality rate(%)	No. of case	Fatality rate(%)
Male	233	20.2	21	23.8
Female	172	18.0	14	28.6
Total	405	19.3	35	25.7

## Fatality of severe cases, by gender, 2000~2001

	2000*		2001	
	No. of case	Fatality rate(%)	No. of case	Fatality rate(%)
Male	183	9.84	235	14.9
Female	108	21.3	154	13.0
Total	291	14.1	389	14.1

\* p<0.05

## Incidence of severe EV infection, by age, 1998~1999

	1998**		1999**	
	No. severe case	Incidence rate(1/100,000)	No. severe case	Incidence rate(1/100,000)
≤6month h	51	38.5	21	9.3
7- 12month h	47		4	
1yr - 5yr	262	16.2	8	0.6
6yr - 9yr	22	1.7	1	0.1
10yr - 16yr	16	1.0	1	0.1
Total	398	8.3	35	0.7

\*\* P<0.01

## Incidence of severe EV infection, by age, 2000~2001

	2000**		2001**	
	No. severe case	Incidence rate(1/100,000)	No. severe case	Incidence rate(1/100,000)
≤6month h	45	31.5	41	39.7
7-12month h	40		66	
1yr - 5yr	199	12.8	272	17.5
6yr - 9yr	5	0.4	8	0.6
10yr - 16yr	2	0.1	2	0.1
<b>Total</b>	<b>291</b>	<b>6.1</b>	<b>389</b>	<b>8.2</b>

\*\* P<0.01

## Fatality rate of severe EV infection, by age, 1998~1999

Age	1998**			1999		
	No. of severe case	Dead cases	Fatality rate (%)	No. of severe case	Dead cases	Fatality rate (%)
<=6 month	51	14	27.5	21	7	33.3
7-12month	47	19	40.4	4	1	25.0
1yr-5yr	262	44	16.8	8	1	12.5
6yr-9yr	22	2	9.1	1	0	0.0
10yr-16yr	16	0	0.0	1	0	0.0
Total	398	79	19.8	35	9	25.7

\*\* P<0.01

## Fatality rate of severe EV infection, by age, 2000~2001

Age	2000			2001		
	No. of severe case	Dead cases	Fatality rate (%)	No. of severe case	Dead cases	Fatality rate (%)
<=6 month	45	5	11.1	41	13	31.7
7-12month	40	5	12.5	66	10	15.2
1yr-5yr	199	31	15.6	272	29	10.7
6yr-9yr	5	0	0.0	8	2	25.0
10yr-16yr	2	0	0.0	2	1	50.0
Total	291	41	14.1	389	55	14.1



# Enterovirus isolated from outpatients and severe cases

## 1998~2001

virus type	1998		1999		2000		2001	
	Outpatients	Severe cases	Outpatients	Severe cases	Outpatients	Severe cases	Outpatients	Severe cases
EV71	55(56.7% )	77(91.7% )	6(23.1% )	6(20.7%)	39(33.1% )	152(87.9%)	142(40.3% )	182(92.4%)
CoxA	42(43.3% )	2(2.4% )	5(19.2% )	1(3.4%)	53(44.9% )	2(1.2%)	129(36.7% )	2(1% )
CoxB	-	2(2.4% )	13(50% )	22(75.9%)	24(20.3% )	15(8.7%)	17(4.8% )	0
ECHO	-	3(3.5% )	2(7.7% )	-	2(1.7% )	4(2.3%)	64(18.2% )	13(6.6%)
Total	97	84	26	29	118	173	352	197

## Enterovirus isolated from dead cases, 1998~2001

	1998	1999	2000	2001
virus type	Severe cases	Severe cases	Severe cases	Severe cases
EV71	34(97.1% )	1(12.5%)	25(89.3%)	26(83.9%)
CoxA	0	0	0	0
CoxB	1(2.9% )	7(87.5%)	2(7.1%)	0
ECHO	0	0	1(3.6%)	5(16.1%)
Total	35	8	28	31

## Virus isolation of severe cases, by complication, 1998~2001

	EV71	CoxA group	CoxB group	ECHO group	Others	Total
Encephalitis	339	18	13	25	138	533
Encephalitis+Pulmonary edema / hemorrhage	36	0	1	0	8	45
Pulmonary edema / hemorrhage	42	0	1	0	7	50
Encephalitis+Myocarditis	9	0	2	0	3	14
Myocarditis	6	1	1	0	5	13
Others	86	2	21	10	18	137
Total	518	21	39	35	179	792
Percent(%)	65.4	2.7	4.9	4.4	22.6	100.0

# Conclusion

- EV71 infection has become an important problem of public health in Taiwan.
- Cases occurred in whole Taiwan between April and August, and peaked in June.
- Most severe cases occurred in children younger than 5 years old.
- Vaccine development would be considered for prevention of EV71 infection in the future.

**Thank you**